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How cultural impact on knowledge sharing contributes to organizational performance: using the fsQCA approach

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Abstract

Knowledge sharing is crucial for attaining a competitive edge in organizations. Knowledge and performance motivate organizations to launch new innovative products and services to sustain market advantages among competitors. Many factors have been shown to be determinants for supporting organizational performance growth, one of which is organizational culture. The objective of this paper is to analyze the organizational culture that supports knowledge sharing activities for organizational performance, innovation and strategy.

This paper uses a sample of 107 cases to examine the empirical data. The results demonstrate the role of organizational culture with an innovative strategy in knowledge sharing, which directly contributes to the improvement of organizational performance. Using fsQCA, this paper relates the impact of organizational culture on the business activities within an organization.

The main findings of this paper analyze and test the relation between organizational culture and knowledge sharing components for organizational strategies.

Keywords: Knowledge sharing, Culture, Innovation, Organizational performance, fsQCA.

1. Introduction

Several major industrial reviews (Arpaci, 2017; Hashemi & Kohestani, 2016; Tsai, 2016) have identified that organizations need to improve their efficiency. A conducive, progressive and enduring culture is believed to be a foundation for efficiency (Y. J. Chen, 2010; Flanagan, 2010). Therefore, developing organizational culture serves several important purposes. First, it conveys a sense of identity for organization members. Second, it facilitates the generation of commitment (Nelson, 2011). Third, culture enhances the stability of the organization (Liu, Moizer, Megicks, Kasturiratne, & Jayawickrama, 2014). Fourth, culture serves as a sense-making device that can guide and shape behavior (Wang & Rafiq, 2014).

This study attempts to identify the role of organizational culture and to expand knowledge sharing research through comparative analysis of these relationships to innovative strategy and organizational performance. This study emphasizes the significance of the inter-relationships of the components that support performance, and it investigates the indirect impact of organizational culture on organizational performance based on prior studies (Akgun, Keskin, & Byrne, 2009; Allen, Smith, Mael, O'Shea, & Eby, 2009; Child, 1974; Heisler, 1974; Herold, 1972; Pot & Koningsveld, 2009; Yazici, 2009). In Section 2, this paper reviews the related literature. Sections 3 and 4 present the conceptual model and empirical findings, respectively. Section 5 provides a discussion. Section 6 concludes and presents directions for future research.

2. Theoretical background

Based on past studies, factors influencing performance in an organization determine how successfully the organization thrives in terms of competition (Chatzoglou & Soteriou, 1999; Collinson, 1999; DiBella, Nevis, & Gould, 1996; Ma, Du, Ma, & Zhang, 2009; Nor, Selamat, Abdullah, & Murad, 2009); Oyemomi, Liu, and Neaga (2015); (Oyemomi, Liu, Neaga, & Alkhuraiji, 2016; Priem, 1994; Ren, 2009; Wong & Davis, 2009). Factors such as leadership style, culture, structure and learning are significant to how management of resources within the organization sustains a competitive edge in an innovative market.

2.1 Organizational culture

One of the early influential studies on organizational culture was on its definition and implications for managers. Nelson (2011), Peterson (1982), and Rasmussen and Hall (2016) advocated the organizational culture model and discuss culture as a pattern of basic assumptions invented, discovered, or developed by a given group as it learns to cope with its problems of external adaptation and internal integration. Organizational culture thus serves the leader of an organization through nurturing the value system to serve incoming members. According to Ruppel and Harrington (2001), a strong culture is one where the implicit and explicit assumptions are in harmony.

Levels of culture can be analyzed by their degree of visibility to observers (Palermo, 2011). Artifacts are at the base level and include all the phenomena that one sees, hears and feels when one encounters a new group with an unfamiliar culture. Nonetheless, these artifacts reflect the beliefs and values shared by members of an organization. The

innermost level of culture is the basic assumptions that members of an organization ascribe to when adapting to an environment. It represents a level of concordance in the basic assumptions that are believed to be non-confrontable and non-debatable. Staadt (2015) found that organizational culture is the most prominent enabler in enhancing knowledge sharing in transnational projects. Atkins and Turner (2006) advocated that management of uncertainty is a necessary condition for effective project management. In this regard, it is suggested that organizations pay attention to their culture and develop appropriate infrastructure and capabilities to manage uncertainties. (Langerak, Hultink, & Robben, 2004) highlight the danger of cultural mismatch when the business model of an organization changes. Likewise, similar project management issues will arise when a project manager needs to manage a group of organizations displaying different cultural characteristics (Shockleyzalabak & Morley, 1989). These studies also raise the need to consider contextual factors in organizational culture studies. Two interesting study gaps can be noted. First, the concept of organizational culture in project management has only been explored under specific contexts.

To accomplish this objective, a literature review was performed to long-list artifacts that identify organizational culture in organizations. The ranking of the relative importance of organizational culture factors were then assessed. Referring to the significance rankings, management will have a better understanding about the factors shaping the contracting organizations' behavior. Efforts to foster an organizational culture conducive to the achievement of project goals can be more focused by setting a target and then directing resources and establishing benchmarks for the respective artifacts. In other words, monitoring the wellbeing of the artifacts will inform the status of organizational culture as well as management action.

2.2 Knowledge sharing components

Knowledge sharing can be achieved through people and technology once they are created, identified or captured; the next stage is to circulate knowledge around the organization (Lee, Liu, & Wu, 2011). Zhou and Li (2012) highlight that this is perhaps the single most important knowledge management practice because it embodies all the opportunities and challenges associated with managing intangible, invisible assets. While technology may help in the capture and distribution of knowledge, emphasis should be placed on the organization. Koh and Kim (2004) suggest that for an organization to succeed in knowledge management, it is imperative for it to have a supportive corporate environment, which is defined by Crane (2012) as the norms and values that bind an organization together. With regard to knowledge, Bandyopadhyay and Pathak (2007) propose that organizations create and share knowledge to remain competitive.

Despite the criticism of the SECI model, it has a strong theoretical basis to be used in national, organizational, professional, and personal cultural levels. It has the potential to cover both knowledge creation and transfer at individual, group, and organizational levels. The culture and its impact on knowledge creation and the use of the SECI model will enhance the insights of organizations into the knowledge creation and processes involved in it (Ho, Hsu, & Oh, 2009). The use of the SECI model for measuring knowledge creation and sharing in different knowledge intensive firms in the USA and Spain is widely acknowledged. The SECI model in multiorganizational projects is used to measure knowledge capture, sharing and value creation, while investigating its role in the IT sector.

In terms of the universal applicability of the SECI model in different cultural contexts, the applicability of this model for measuring knowledge creation in banks may be questionable (Oyemomi et al., 2016). Therefore, to determine

1. whether the SECI knowledge conversion process is supported within banks,
2. whether organizational culture in banks has any relationship with the knowledge creation process,
3. whether senior management is clear about knowledge management implementation in banks, and
4. whether the present banking knowledge management system facilitates knowledge dissemination and the smooth processing of information accessibility across the branches,

this study opted for the SECI model for knowledge creation in the context of organizational culture.

2.4 Organizational performance

Different philosophies about organizational performance (Reschka, Bagschik, Ulbrich, Nolte, & Maurer, 2015) exist. The ability of an organization to achieve set objectives of retaining profits, having a competitive edge, increasing market share, and maintaining long-term survival depends on using applicable organizational strategies and action plans. This study considers organizational performance as a measurement of productivity by considering the knowledge contributions of an organization's employees. Many studies discuss the search for organizational peak performance (Combs & Ketchen, 1999; Vandenberghe, 1999; Zhao, Chen, & Xiong, 2016) as the ultimate goal of the organization. Therefore, organizations covering different domains

constantly compete to improve these performances by developing an edge that differentiates each organization from competitors.

Organizations employ internal measuring criteria, that is, key performance indicators, as performance measurement units. Organizational investment in performance measurement systems is very important for performance evaluation, which directly influences the manner of assessing the level of achievement of performance objectives and the review of strategic plans. Researchers mostly evaluate organizational performance using broad categories known as performance elements, which is a system that receives inputs and adds value. These elements are effectiveness, efficiency, quality, profitability, quality of innovation, and productivity (Y. Chen, Cook, Li, & Zhu, 2009). High-performing organizations actively and regularly assess individual performance and measure progress against established target values using these elements. These elements provide a mechanism for organizations to assess unit financial and nonfinancial performances. High-performing organizations not only aim to sustain a predefined level of performance but also constantly strive to optimize organizational performance by improving performance elements.

3. Conceptual model

In the knowledge creation theory, organizational culture as an antecedent is not assumed, although it is generally claimed that culture is a function of knowledge creation. Therefore, to assume that culture can be a primary antecedent of knowledge creation, this study needs to look at the nature of both culture and the knowledge creation process. Knowledge management practices and knowledge sharing, management and transfer, the relationship between organizational culture and specific

knowledge management processes are not investigated despite the recognition of the influence of culture on effective knowledge management implementation (de Vasconcelos, Kimble, Carreteiro, & Rocha, 2017).

Historically, Sullivan and Nonaka (1986) theorize that knowledge is created when both tacit and explicit knowledge are complementing and interfacing with each other through four switching modes; namely, socialization, externalization, combination, and internalization. It is suggested that the basic cognitive process of knowledge conversion between tacit and explicit knowledge is a natural process that is highly dependent on culture and the supporting environment. Abel (2015) reported three elements (i.e., intention, autonomy and fluctuation) of the knowledge creation and formation process that are likely to induce individual commitment in an organizational setting. Previously, individual intention had been assumed to be an attitude that not only was free from any consciousness but also did not regard the subject commitment to an object. It was later postulated that both the environmental information and the preoccupied frame of judgment are principal factors in the knowledge creation process, as it increases the individual intention and the degree of meaningfulness.

The cognition process requires individual, group and organizational level autonomy. Thus, cognition is the process of knowing and understanding which intention facilitates judging the value of the information. In the knowledge creation process, organizations need to be flexible in acquiring, relating and interpreting information. However, individual autonomy is a complex ingredient that gives individuals the freedom to absorb knowledge. Apart from two internally driven knowledge creation elements, fluctuation is more externally driven, which is more sensitive to external environmental

forces. It posits that the environmental malfunctions also create new avenues for individuals and organizations to redefine, recreate and reformulate new patterns of solving problems through interactions with the external world.

Moreover, organizational culture offers a mutual system of learning in which people can share and exchange life or work experiences through social interaction. Schilling and Fang (2014) found people's cognitive capacities could be changed if people are exposed to a new host culture. In other words, culture either pacifies the environment in which knowledge creation occurs or it tends to regulate individual behavior, which is important for knowledge creation and exchange. Thus, organizations should provide an environment in which people utilize these cognitive capacities during workplace socialization for knowledge creation, sharing and use.

The concept of knowledge sharing is also discussed in terms of individual behavior. For example, Liao and Wu (2009) argued that knowledge sharing is a behavioral phenomenon, as behaviors are playing a mediating role in the knowledge creation process. Culture determines an individual's behavior, whereas behavior is a result of different sociological forces that have the capability to influence people.

Table 1 The Conceptual Framework

More specifically, Park, Chae, and Choi (2017) identified three primary elements of organizational culture; namely, values, norms and practices that directly impact behaviors that, in turn, keep influencing knowledge creation sharing and its utilization. It is argued that values, norms and practices are fundamentally interconnected at

multiple (i.e., top - bottom) levels. Values are deeply rooted and may not be easily expressed, but they would affect knowledge creation capability because they manipulate individual behavior that could be the source of useful knowledge creation. Therefore, it suggested that the interplay between norms and values support the desired behavior, which is necessary to create and sustain knowledge creation and sharing capability. It further indicated that culture demonstrates a specific set of practices that are required in daily routines. Thus, practices symbolically provide a direct lever for change that may be needed to support knowledge creation, sharing, and use.

Moreover, it is strongly believed that the knowledge creation process is not only culturally situated but also stems from a specific cultural context. In addition, the four SECI knowledge creation modes (socialization, externalization, combination, and internalization) are robustly influenced and created by culture and cultural attributes. Due to a scarcity in the literature, an attempt has been made to connect some elements of organizational culture and the four knowledge creation processes at an organizational level for which it was originally intended (Jayawickrama, Liu, & Hudson Smith, 2017). More specifically, following question is addressed: How does organizational culture influence knowledge sharing capability? Therefore, the objective of this study is to investigate the relationship between organizational culture and the knowledge sharing process in a knowledge-intensive organization. The following section summarizes the concept based on organizational culture and knowledge sharing relationship studies.

4. Empirical findings

As a set theoretical approach, fsQCA is specifically designed for case-oriented exploration of phenomena in the social sciences, therefore demonstrating complex

causality, such as characteristics of configurational equifinality and casual asymmetry, while considering a small number of cases. The fsQCA finds an association of subset entities between independent and dependent conditions that miss using traditional analysis techniques. In addition, fsQCA provides a systematic approach for data calibration and the quantification of qualitative data set fuzzy set (fuzzy set membership assignment) (Woodside, Sullivan, & Trappey, 1999)

4.1 Data and calibration

This study uses fsQCA to demonstrate a holistic and comprehensive view of the antecedents and complex solutions of business process and knowledge-sharing integration project outcomes (Espinosa & Lindahl, 2016). Complementarity and equifinality, the two main arguments of this research, share the same underlying assumption as the established theoretical approach stating that patterns of attributes will exhibit distinctive features and lead to different outcomes depending on how people are arranged (Ali, Kan, & Sarstedt, 2016). In other words, contextuality, which is how attributes within a case of concern are arranged (as present or absent conditions) and interacted, rather than the net effect of all attributes (as isolated items), determines the outcome. Complementarity exists when there is a match between causal factors, which leads to a higher level of outcome. Similarly, equifinality occurs when there are at least two different paths (a combination of causal factors) that result in the same level of outcome. However, although the discussion of organizational configuration stresses causal asymmetry, synergistic effects and equifinality, previous research studies have been conducted mainly using an econometric method, which relies on causal symmetry, additive effects and an assumption of unifinality because of the lack of the alternative

techniques supporting causal asymmetry, synergistic effects and equifinality assumptions.

This assumption mismatch resulting from a methodological gap makes it impossible to capture, not to mention test, complementarity and equifinality, potentially leading to equivocal results in prior studies. For instance, regression analysis is based on the independent contribution of a variable while everything else stays the same, usually called a *ceteris paribus* assumption. By focusing on the net effect of a variable without considering the meaning of the presence or absence of other variables, regression analysis cannot identify in which situations a variable has more (or less) influence on the outcome. In other words, correlation-based analysis cannot both detect complementarity and consider equifinality (Huang, Wu, Lu, & Lin, 2016).

The interaction effect and two- and three-way interactions have been utilized in organizational configuration studies to circumvent the limitations of regression analysis. Nonetheless, a three-way interaction is largely the current boundary of interpretation. Furthermore, the assumption that its estimated nonlinear relationship applies to all cases under examination stands in direct opposition to the equifinality assumption.

Another attempt to overcome the limitations of regression analysis in organizational configuration studies is the use of cluster analysis. Although cluster analysis can identify and group similar cases according to these characteristics, which then allows the use of ANOVA or MANOVA to test whether there is a difference in performance between these groups, it treats each combination of characteristics as a black box, since only differences between groups of variables can be identified (Oyemomi et al., 2016).

This method cannot explain how each of these variables is relevant to the outcome. In fact, it cannot even determine whether a particular variable shown in the identified group is really a part of the cause. Therefore, one of the weaknesses of this technique is that it is possible that the cluster analysis will classify two cases with many similar variables in the same group, whereas these variables are, in fact, irrelevant to the outcome. In addition, cluster analysis relies on the researcher's judgment regarding the choice of sample and variables, scaling of variables, stopping rule, similarity measure and clustering method. Consequently, cluster analysis is not suitable for studying organizational configuration.

Previously used methods to study organizational configuration have gradually been improved, but the key problem remains because the fundamental assumptions of these methodologies have not yet taken the premise of causal complexity into consideration. With a completely symmetrical perspective, people test equally for a connection between the absence of the cause and the absence of the effect. In other words, researchers assume that the explanations for both negative and positive outcomes are based on the same mechanisms and conditions, which is not true for the nature of social science causal relationships. Obviously, the reasons causing low performance are not necessarily the reverse of those causing high performance. Similarly, the explanations for extremely high performance can be vastly different from those that result in moderately high-performance levels. Consequently, conventional quantitative analysis, especially correlation, is blind to the causal asymmetry assumption of set theoretic relationships, resulting in previous inconsistent findings.

Therefore, understanding of complementarity and equifinality cannot be developed further without using a new empirical methodology that takes the concept of causal complexity (set theoretic relationships) into account. This set theoretical approach is uniquely suitable for analyzing the impact of complementarity between a business unit's KS and a firm's OC on the business unit's performance because it is based on the set relationship understanding of how causes combine to bring about outcomes and because it can handle significant levels of causal complexity (Ragin, 2008; Fiss, 2007). Furthermore, in contrast to regression analysis, nonparametric, set methods make sample representativeness less of a concern because researchers do not assume that data are drawn from a given probability distribution. In addition, as part of QCA procedure, which will be explained later, the calibration of sets to measure research constructs reduces sample dependence. This is because set membership is defined relative to substantive knowledge rather than the sample means, thereby further reducing the importance of sample representativeness (Fiss, 2007).

In summary, these points suggest that a set-theoretic approach will allow the analysis of small to medium-sized situations in which the number of cases is too large for traditional qualitative analysis and too small for many conventional statistical analyses, for example between 10 and 50 cases. However, it should be noted that although QCA was initially considered to be a small-N approach, more recent works have extended QCA to large-N settings unproblematically.

4.2. Complex causal statements culture and knowledge outcome

The model examines the complex antecedent conditions with relationship membership scores in the outcome condition of organizational performance by

comparing organizational culture, knowledge sharing, and the corresponding negated value of organizational performance. Hence, this study measures consistency scores for all possible complex causal combinations for the outcome conditions and applies a cutoff consistency score value of 0.80. The result shows the combinations with consistency scores higher than this threshold. Table 2 shows that all solutions are informative, and therefore, the consistency values are higher than 0.74, and all coverage values range between 0.25 and 0.90, as previous studies suggest (Ragin, 2008). The first pathway indicates that a high contribution of knowledge-sharing activities, with innovative business processes and consideration of key organizational factors results in high performance of business activities for informed organizational decision making (consistency = 0.88; coverage = 0.75). The second pathway indicates the combination model from the complex solution, as shown in Table 2, (frequency cutoff = 1.00; consistency cutoff = 0.90). The low corresponding negated value of organizational factors in combination with other antecedent conditions produces coverage.

Table 2: Descriptive statistics of membership scores of survey data after calibration

A complex antecedent condition shows the relationship of high knowledge-sharing activities to an organizational culture that can influence the implementation of organizational performance (Woodside et al., 1999). Similarly, knowledge sharing appears in combination with antecedent conditions of the derived pathways. However, the high impact of organizational culture appears to determine one of the derived pathways, suggesting that presence is a major condition for high organizational performance during business-process implementation and sustainability.

Table 3: Result of culture and knowledge components comparativity**5. Discussion**

This study examines how organizational culture influences the implementation of knowledge sharing processes for improved organizational performance. Deviation from (LCD-IE) probably arises from all three possible explanations. Regarding external validity, although this questionnaire, which asked respondents to compare these business units with three main competitors, and this KS typology classification technique 39 comply with previous research (Woodside et al., 1999) and enable me to consider both best cost and stuck in the middle strategies, data unintentionally assumes that culture with mid-market positions are generally unattractive or unprofitable, even though there are many examples of successful firms using mid-market positions. Therefore, Oyemomi et al. (2016) suggest that incorrectly classifying culture units for which both LC and DIF scales are below the median as stuck in the middle in turn results in the finding that stuck in the middle also performs well. In other words, it can be inferred from the research that this study incorrectly classifies business units as stuck in the middle, thereby producing erroneous findings.

As a result of this view, employees are less motivated to develop technical knowledge of the product, and thus are unable to explain the value of these products. Therefore, managers are not informed about the product and coverage and hence shift these performance criteria from value to price alone, which, in turn, reconfirms the misbelief of top managers and agencies. Furthermore, increased automation of underwriting and identical premium quotations based on customer inputs result in price-

taker, rather than price-maker, activity within the industry. This is especially true of compulsory motor insurance; however, for voluntary insurance policies, there is still a difference depending on each insurer's pricing policy (profit margin) because of its differentiation strategy. This misunderstanding has been identified, and attempts are being made to correct it, but this endeavor is still far from succeeding.

In terms of alternative theory, since cost is a result of every activity, a cost reduction program appears to be adopted by all business units no matter which KS management intends to pursue. The outcome also argues that a differentiator cannot ignore its cost position because its premium prices will be nullified by a markedly inferior cost position; therefore, this should always aggressively pursue all cost reduction opportunities that do not sacrifice differentiation to achieve cost parity or proximity relative to its competitors. Although all pursue a low-cost strategy, only the former in each case has coherence between business unit posture and firm routine, thereby successfully defeating competitors by being low-cost leaders. This study considers organizational culture as a key catalyst to achieve organizational goals, implement business-knowledge processes, and sustain organizational performance.

6. Conclusions and future research

This analysis shows that the significant contribution of knowledge sharing in any organization could improve performance when there is an enabling culture. fsQCA provides an innovative analytic technique to compare the impact of organizational culture on the implementation and the continuous practice of an integrated business-knowledge process. The results provide possibilities for enhanced performance when an enabled environment exists for generating new knowledge. The use of fsQCA in this

research offers a new understanding of the contribution of knowledge sharing to organizational performance.

This study has some limitations. First, the proposed conceptual model considered only three components; therefore, other components, such as leadership, might support the explanation of antecedent conditions for complex solutions. Future work should consider including other organizational operation factors by identifying specific characteristics of organizations based on country of operation; for example, factors associated with organizations in China might not apply to organizations in the United States. Third, this study focuses mainly on a truth table complex solution, considering organizational factors as an indirect variable for the organizational performance outcome; however, multiple indirect variables yield more solutions, which provide more analytical results for future work to improve the validity of the results.

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Tables

Table 1 The Conceptual Framework

Construct		Definition	Calibration – 3 anchor points		
			0	0.5	1
Knowledge Sharing: KS	Defender: D	Business units that have a narrow product-market focus to secure a stable market niche	3	4.5	7
	Analyzer: A	Business units that operate in two types of product-market domains, one that is relatively stable and the other in flux			
	Prospector: P	Business units that continually search for new market opportunities			
	Reactor: R	Business units that respond to the challenges of the adaptive cycle in uneven and transient ways			
	Low-Cost Leadership: LC	Business units that provide comparable products at lower cost than competitors	Q1	Q2	Q3
	Differentiation: DIF	Business units that tailor these products or services to fulfill unique customer needs, allowing organizations to charge a premium price to capture market share			
Organizational Culture: OC	Operations: OP	Capability that integrates logistics systems, controls costs, manages financial and human resources, forecasts revenues, and manages marketing planning	Q1	Q2	Q3
	Product Design and R&D: RD	Capability that pertains to production process efficiency, cost reduction, greater consistency in delivery and greater competitiveness			
	Management Information System: MIS	Capability that helps an organization create technical and market knowledge and facilitates intra-organizational communication flow			
	Sales & Distribution: SD	Capability that relates to focused market sensing and linking outside the organization			
	Marketing: MKT	Capability that integrates many marketing activities			
	Input Efficiency: IE	The business unit's cost reduction advantage	Q1	Q2	Q3

Performance Dimension: PD	Output Efficiency: OE	The revenue expansion advantage	Q1	Q2	Q3
	Effectiveness: EF	The success of a business's products and programs in relation to those of its competitors in the market	Q1	Q2	Q3
	Adaptability: AD	The business's success in responding to changing conditions and opportunities in the environment	Q1	Q2	Q3
	Overall Performance Proxy: OA	The overall corporate performance goal is to increase long-run profits with a view toward maximizing the value of the firm	Q1	Q2	Q3

Table 2: Descriptive statistics of membership scores of survey data after calibration

Survey data						
	Mean	Std. Dev.	Min.	Max.	N Cases	Missing
Knowledge Sharing: KS						
<i>Prospector</i> (p)	0.07675969	0.1860109	0.00012339	0.95257	107	0
<i>Analyzer</i> (a)	0.5891829	0.3795915	0.00012339	0.99959	107	0
<i>Defender</i> (d)	0.1822357	0.3078002	0.00012339	0.9955	107	0
<i>Reactor</i> (r)	0.01510802	0.06770562	0.00012339	0.64566	107	0
<i>Differentiation</i> (dif)	0.4970566	0.413801	0.000049522	0.99945	107	0
<i>Low-Cost leadership</i> (lc)	0.4859037	0.3995412	0.00074603	0.99966	107	0
Organizational Culture: OC						
<i>Operation capabilities</i> (op)	0.5204947	0.404373	0.00027961	0.99978	107	0
<i>R&D capabilities</i> (rd)	0.5359848	0.4050848	0.00055278	0.99753	107	0
<i>MIS capabilities</i> (mis)	0.5054322	0.4291049	0.0000061442	0.99995	107	0
<i>Sale & distribution capabilities</i> (sd)	0.5148085	0.4215927	0.000037169	0.99331	107	0
<i>Marketing capabilities</i> (mkt)	0.5303368	0.4190876	0.000013007	0.99925	107	0
Performance dimensions: PD						
<i>Input efficiency</i> : Expense ratio (ie)	0.4532633	0.3889686	0.00091105	0.99753	107	0
<i>Output efficiency 1</i> : Loss ratio (oe1)	0.5119707	0.3844112	0.00055278	0.99753	107	0
<i>Output efficiency 2</i> : Investment Yield (oe2)	0.4389924	0.3259911	0.047426	0.99945	107	0
<i>Effectiveness 1</i> : Net written premium growth (ef1)	0.4658962	0.3812927	0.017986	0.99945	107	0
<i>Effectiveness 2</i> : Market shares (ef2)	0.5024591	0.417362	0.0066929	0.98201	107	0
<i>Adaptability 1</i> : Number of new products offered (ad1)	0.5139921	0.4050486	0.047426	0.99978	107	0
<i>Adaptability 2</i> : Percentage of net written premiums accounted for by new products within the past year (ad2)	0.4468843	0.4096512	0.047426	0.99999	107	0
<i>Overall performance 1</i> : Combined ratio (oa1)	0.5215535	0.398142	0.00055278	0.99753	107	0
<i>Overall performance 2</i> : ROE (oa2)	0.555875	0.4073075	0.0000061442	0.99945	107	0

Table 3: Result of culture and knowledge components comparativity

Condition	KS-IE			KS-IEF
	S1	S2	S3	S1
Prospector (P)	Θ^*	Θ^*	Θ^*	Θ^*
Analyzer (A)	Θ	●	●	Θ
Defender (D)	Θ	Θ	Θ	Θ

Reactor (R)	Θ^*	Θ^*	Θ^*	●
Differentiation (Dif)	Θ	Θ	●	•
Low cost (Lc)	Θ	●	Θ	
Observed cases	7	5	4	1
Consistency	0.724529	0.713514	0.704821	0.900405
Raw coverage	0.229618	0.209680	0.183706	0.022014
Unique coverage	0.137127	0.107350	0.069850	0.022014
Solution consistency	0.718015			0.900405
Solution coverage	0.437901			0.022014
T1: $H \bullet S \subset Y$ -Consistency	0.539667	0.545450	0.622072	0.808104
T1: $H \bullet S \subset Y$ -Raw coverage	0.043730	0.043524	0.036555	0.003689
T2: $\sim H \bullet S \subset Y$ -Consistency	0.722497	0.713185	0.703511	0.890097
T2: $\sim H \bullet S \subset Y$ -Raw coverage	0.227479	0.210136	0.183932	0.022590
T3: $H \bullet \sim S \subset Y$ -Consistency	0.814957	0.814957	0.814957	0.651971
T3: $H \bullet \sim S \subset Y$ -Raw coverage	0.112421	0.112421	0.112421	0.100733
T4: $\sim H \bullet \sim S \subset Y$ -Consistency	0.463812	0.478831	0.485383	0.523584
T4: $\sim H \bullet \sim S \subset Y$ -Raw coverage	0.837649	0.873858	0.891719	0.934861
Solution path hypothesis result	Reject	Reject	Reject	Support
Combined solution path unique coverage of same hypothesis result	0.314327			0.022014
Overall hypothesis result	Reject			Support